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Squaring (1) and subtracting (2) from it, we have  $xy=800\left(1-\frac{1}{\pi}\right)$

$(2-\sqrt{2})\dots(3)$ . Now we at once get  $y-x=40\sqrt{1-2\left(1-\frac{1}{\pi}\right)(2-\sqrt{2})}\dots(4)$ .

Combining (1) and (2), we finally obtain

$$x=40\left[1-\sqrt{1-2\left(1-\frac{1}{\pi}\right)(2-\sqrt{2})}\right], \quad y=40\left[1+\sqrt{1-2\left(1-\frac{1}{\pi}\right)(2-\sqrt{2})}\right].$$

Also solved by *P. H. PHILBRICK, G. B. M. ZERR, H. M. CASH, P. S. BERG, CHARLES E. MYERS, J. A. CALDERHEAD, SETH PRATT, and H. C. WHITAKER.*

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## CALCULUS.

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Conducted by *J. M. COLAW, Monterey, Va.* All contributions to this department should be sent to him.

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## SOLUTIONS TO PROBLEMS.

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16- Proposed by *F. P. MATZ, M. Sc., Ph.D., Professor of Mathematics and Astronomy, in New Windsor College, New Windsor, Maryland.*

Differentiate  $\tan^{-1}\left(\frac{2x}{1-x^2}\right)$  with regard to  $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ .

Solution by *J. F. W. SCHEFFER, A. M., Hagerstown, Maryland.* and *CHARLES E. MYERS, Canton, Ohio.*

Let  $\frac{2x}{1-x^2}=z$ , then  $\tan^{-1}\left(\frac{2x}{1-x^2}\right)=\tan^{-1}z$ ; but  $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$  by Trigonometry equals  $\tan^{-1}\left(\frac{2x}{1-x^2}\right)=\tan^{-1}z$ . Hence  $\frac{dz}{dz}=1$ , that is, since both expressions are identical, the first differential coefficient is=1.

Also solved by Professor *MATZ, SCHMITT, and ZERR.*

17. Proposed by *H. W. DRAUGHON, Clinton, Louisiana.*

To find the volume generated by revolving a circular segment whose base is a given chord, about any diameter as an axis.

Solution by the PROPOSER.

In the circle, center *C*, draw any diameter *ECF*, and also any chord